IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kenneth G. Ricks, et al	Examiner:	Thomas H. Stevens
Serial No.:	09/728,407	Group Art Unit:	2711
Filed:	December 1, 2000	Docket:	MFS-31524-1
Title:	SYSTEM AND METHOD FOR CREATING ARCHITECTURAL DESCRIPTIONS OF REAL-TIME SYSTEMS		

APPEAL BRIEF TO THE BOARD OF
PATENT APPEALS AND INTERFERENCES OF THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Appellant's Brief on Appeal

This brief is presented in support of the Notice of Appeal filed on Oct. 27, 2005 from the Final Rejection of amended claims 1, 3-13 and 15-25 of the above identified application, as set forth in the Final Office Action mailed July 27, 2005.

Appellant respectfully traverses the rejections and requests reversal of the rejection of pending amended claims 1, 3-13 and 15-25.

TABLE OF CONTENTS

Real Party in Interest

The present application has been assigned to the National Aeronautics and Space Administration having an office and place of business at George C. Marshall Space Flight Center LS01 / Office of Chief Counsel, Huntsville, AL 35812, in an assignment recorded on December 1, 2000, on Reel 011336, Frame 0108.

Related Appeals and Interferences

There are no other appeals or interferences known to appellant that would have a bearing on the Board's decision in the present appeal.

Status of the Claims

On December 1, 2000, the application was filed with claims 1-25. A first non-final Office Action dated April 5, 2004 rejected the original unamended claims 1-25. In a response by the appellant dated October 18, 2004, claims 2 and 14 were cancelled without prejudice and all of the independent claims 1, 5, 12, 17 and 24 were amended. On December 29, 2004, a Final Office Action rejected claims 1, 3-13 and 15-25. On June 29, 2005, Appellant filed a Request for Continuing Examination with a preliminary amendment. A Final Office Action dated July 27, 2005 rejected all pending amended claims 1, 3-13 and 15-25. On October 27, 2005, appellant appealed from the final rejections of amended claims 1, 3-13 and 15-25 contained in the Final Office Action dated July 27, 2005. The amended claims on appeal are set forth in Appendix A. The claims are amended since the final rejection to correct formalities.

Status of the Amendments

Subsequent to the final Office Action dated July 27, 2005, appellant submits the following amendments to remedy formal errors:

IN THE TITLE

Please amend the title as follows:

SYSTEM AND METHOD FOR CREATING ARCHITECTURAL[ARCHITECTUALS] DESCRIPTIONS OF REAL-TIME SYSTEMS

IN THE CLAIMS

Please amend the claims as follows:

Claims 1, 5, 10, 12, 17, 22 and 24 are amended to remove periods in the numbering of the items in the claims. Claims 3, 4, 6, 7, 15, 16, 18, 19 and 24 are amended to replace "includes" with "comprising."

The preambles of claims 5-11 are amended to change "system" to "computer-readable medium" in response to the 35 U.S.C. 112 rejection and assertion in the Office Action dated 7/27/2005 that "system" is not a statutory type.

Claims 11 and 23 are amended to claim antecedent basis from the proper antecedent claims. All of the amendments correct formal errors.

Summary of the Claimed Subject Matter

The invention describes a system for creating at a computer workstation a graphical description of the architecture of a simulation of a real-world system. The system of this invention generally includes a standardized set of predefined graphical node and arc elements that represent real system

hardware and software processes and the relationships between them; a parameter data input window for further defining any desired graphical node and arc element; a graphical user interface for definition, selection, and arrangement of the graphical node and arc elements; and one or more simulation architecture data files for describing the total simulation architecture arrangement. Although the invention represents software processes as stated above, it also represents processes that occur in the real-world systems being modeled by the simulation that is graphically represented by the invention. In one embodiment of the invention, a user may group graphical node and arc elements into a summary construct called a "container," which allows the user to simplify the graphical representation of the simulation. Using the above-defined components of the invention, a user may graphically represent any simulation architecture, existing or non-existent, simple or complex, at different levels of abstraction.

Grounds of Rejection to be Reviewed on Appeal

A. Whether amended claims 1, 3-13 and 15-25 are patentable under U.S.C. §103(a) over Wells et al ("Parallel Simulation of a Large Aerospace System Multicomputer Environment (1997)) in view of DOME Guide (Honeywell Software (1998)).

Argument

Rejections Under 35 U.S.C. § 103

1) The Applicable Law

The Examiner has the burden under 35 U.S.C. §103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). The M.P.E.P. states that:

> In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant's disclosure.

M.P.E.P. Sec 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

To do that the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.*

The court in *Fine* stated that:

> Obviousness is tested by "what the combined teaching of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 878 (CCPA 1981)). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some

> teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so."
>
> *Id.* (emphasis in original).

The test for obviousness under §103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985.)

In addition, the references cited must be analogous prior art.

2) Discussion of the Rejections.

Amended claims 1, 3-13 and 15-25

Amended claims 1, 3-13 and 15-25 were rejected under 35 U.S.C. 103(a) as being unpatentable under U.S.C. §103(a) over Wells et al. ("Parallel Simulation of a Large Aerospace System Multicomputer Environment (1997)) in view of DOME Guide (Honeywell Software (1998)). This rejection is respectfully traversed. Applicant does not admit that the Wells reference and the DOME reference are prior art and Applicant does not waive rights to swear behind the Wells reference patent or the DOME reference at a later date.

Neither Wells nor DOME disclose "graphical arc elements."

Amended claims 1, 3-13 and 15-25 require "graphical arc elements." The Office Action cites Wells page 519, table 1, base topology, as disclosure of "standardized set of graphical arc elements." However, Wells page 519, table 1, base topology, merely shows straight line graphical elements, not arc elements.

The Office Action also cites page 21 lines 19-20 of the specification of the present patent application as authority for the proposition that the graphical arc elements are defined as "real system functional relationships." Applicant offers the clarification that the passage merely indicates that in some embodiments, the arc elements are representations of real system functional relationships.

Nonetheless, the Office Action also cites Wells page 510, left column, lines 3-9 and 37-39 as disclosure of arc elements "representing each of a plurality of pre-defined timing." Applicant acknowledges that the simulation process disclosed by Wells is time-based, but Wells does not disclose any graphical elements that represent timing.

The Office Action also cites DOME page 6 as disclosure of graphical arc elements that represent "control and data relationships that can be associated with the pre-defined real system components." Likewise, DOME does not disclose any graphical arc elements that represent control and data relationships.

As a result, Wells and DOME do not teach the each and every element of the present claimed invention as required by *In re Fine*, supra. Therefore, Applicant respectfully requests that the rejection of amended claims 1, 3-13 and 15-25 be withdrawn.

Neither Wells nor DOME disclose "periodic processes, aperiodic processes, and continuous processes"

Amended claims 1, 3-13 and 15-25 require "real system components ... include external hardware devices, periodic processes, aperiodic processes, and continuous processes." The Office Action dated July 27, 2005 cites "Wells: pg. 514, left column, Task Allocation, line 14-3" as disclosure of "real system components ... include external hardware devices, periodic processes, aperiodic

processes, and continuous processes." Wells page, 514, left column, Task Allocation, line 14-23 discloses "non-buffered communications" but there is no disclosure as to whether the "non-buffered communication" of Wells is periodic, aperiodic or continuous process. Indeed, there is no disclosure that the "non-buffered communication" of Wells are periodic, aperiodic AND continuous processes.

The lack of disclosure of the above elements suggests to Applicant that the Office Action dated July 27, 2005 plays fast and loose with the language of Wells and DOME. Applicant feels that the Office Action reads language into Wells and DOME that does not exist in Wells and DOME.

There is no motivation to combine Wells and DOME

The Office Action dated July 27, 2005 indicated that "[i]t would have been obvious to one of ordinary skill in the art to use DOME to modify Wells et al. to assist product developers describe the product or system being developed using formal modeling techniques and develop model analysis mechanisms that enhance model understanding (DOME: page. 2 Model-based Development section, bullets 2 and 3 respectively)." This reasoning simply recites the benefits described in the secondary reference DOME without an explanation as to how Wells and DOME can be combined to "make the claimed combination" as required by *In re Fine* or where a reasonable expectation of success of such a combination is established, as required by *In re Fine.* In other words, it uses impermissible hindsight to arrive at the combination without providing a suggestion from the references. As such, the rejection should be withdrawn.

In addition, the Office Action dated July 27, 2005 states:

> "examiner is unclear regarding applicants' statement citing prior art used in the rejection is not sufficient to combine since the DOME reference was disclosed by applicant's (specification, pg. 20, lines 16-17) and one of the inventors authored Wells et al."

The above quotation in the Office Action was apparently made in response to Applicant's attention in the Preliminary amendment to RCE dated June 29, 2005 to the lack of motivation, suggestion or teaching to combine DOME and Wells.

Applicants respectfully submit that no rule or case law indicates that the source or authorship of a reference is relevant to determining allowability of a claim. Mere authorship of a reference by one of the inventors and mere disclosure by the Applicant of another reference is not a suggestion, teaching or motivation to combine references under any point of case law.

None of the Office Actions of this patent application cite any teaching, suggestion or motivation to combine Wells and DOME. Applicant respectfully submits that this omission is not a trivial matter. Rather, the heart of invention is combining known elements to solve a problem. Combining the elements of Wells and DOME is not shown for any purpose, thus it can not be held that it would have been obvious at the time of the invention to combine Wells and DOME to produce amended claims 1, 3-13, and 15-25. Applicant respectfully requests withdrawal of the rejection of amended claims 1, 3-13, and 15-25 because of the lack of motivation, teaching or suggestion to combine DOME and Wells that is at the heart of an obviousness rejection is absent in this matter.

Conclusion of discussion of rejection of Amended claims 1, 3-13 and 15-25.

Neither DOME nor Wells show or teach each of the elements of the independent amended claims, and there is no motivation to combine DOME and Wells, and even if they are combined, at least one element is neither taught nor suggested. As a result, no prima facie case of obviousness has been established. Therefore, Applicant respectfully submits that the rejection of amended claims 1, 3-13, and 15-25 of the present claimed invention should be withdrawn.

CONCLUSION

It is respectfully submitted that the cited art neither anticipates nor renders obvious the claimed invention, and that therefore the claimed invention does patentably distinguish over the cited art. It is respectfully submitted that amended claims 1, 3-13 and 15-25 should therefore be allowed because the Examiner has not made a *prima facie* case of anticipation or obviousness. Reversal of the Examiner's rejections of amended claims 1, 3-13 and 15-25 is respectfully requested.

Respectfully submitted,

James McGroary
Reg. 38,960
NASA
George C. Marshall Space Flight Center
LS01 / Office of Chief Counsel
Huntsville, AL 35812
(256) 544-0013

Date 3/1/06

James McGroary
Reg. 38,960

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail (ED 853443210 US) in an envelope addressed to Commissioner of Patents, P. O. Box 1450, Alexandria, VA 22313-1450 on March 2, 2006.

Name Lisa R. Hughes Signature Lisa R. Hughes

Claims Appendix

1. (currently amended) A system for enabling a user to create on a computer workstation a visually displayed architectural description of a computer simulation of a real system comprising:

[[a.]](a) a standardized set of graphical node elements representing each of a plurality of pre-defined real system components, the real system components including processes and real system hardware associated with the real system, wherein the real system components represented by the standardized set of node elements include external hardware devices, periodic processes, aperiodic processes, and continuous processes;

[[b.]](b) a standardized set of graphical arc elements representing each of a plurality of pre-defined[pro-defined] timing, control, and data relationships that can be associated with the pre-defined real system components, wherein each of the graphical node elements and arc elements displayed at a graphical user interface on the workstation and selectable by the user whereby the user can position selected node elements in a user-defined arrangement and connect two or more of the selected node elements with one or more selected arc elements to create on the workstation the architectural description of the simulation of the real system;

[[c.]](c) a parameter data input window associated with at least some of the selected node and arc elements, the parameter data input window allowing the user to link parameter data with the selected node and arc elements; and

[[d.]](d) a plurality of simulation architecture data files describing the selected node and arc elements, the user defined arrangement of the node and arc elements, and the parameter data input by the user.

2. (previously cancelled without prejudice)

3. (currently amended) The system of claim 1 wherein the standardized set of node elements further [includes]comprises at least one simulation container representing in a single graphical node element a plurality of the real system components.

4. (currently amended) The system of claim 3 wherein the standardized set of node elements further [includes]comprises a boundary node.

5. (currently amended) A [system]computer-accessible medium for enabling a user to create on a computer workstation a visually displayed architectural description of a computer simulation of a real system, the computer-accessible medium comprising:

(a) [[a.]] a standardized set graphical node elements presenting each of a plurality of pre-defined real system components, the real system components including processes and real system hardware associated with the real system;

(b) [[b.]] a standardized set of graphical arc elements representing each of a plurality of pre-defined timing, control, and data relationships that can be associated with the pre-defined real system components wherein the pre-defined timing, control, and data relationships represented by the standardized set of graphical arc elements include data transfer between processes, synchronization between processes, and synchronization with data transfer between

processes, wherein each of the graphical node elements and arc elements displayed at a graphical user interface on the workstation and selectable by the user whereby the user can position selected node elements in a user-defined arrangement and connect two or more of the selected node elements with one or more selected arc elements to create on the workstation the architectural description of the simulation of the real system;

(c)[[c.]] a parameter data input window associated with at least some of the selected node and arc elements, the parameter data input window allowing the user to link parameter data with the selected node and arc elements; and

d[[e.]] simulation architecture data files describing the selected node and arc elements, the user defined arrangement of the node and arc elements, and the parameter data input by the user.

6. (currently amended) The [system]computer-accessible medium of claim 5 wherein the standardized set of graphical arc elements further [includes]comprises a communications container representing in a single graphical arc element a plurality of the timing, control, and data relationships.

7. (currently amended) The [system]computer-accessible medium of claim 5 wherein the synchronization relationship represented by one of the arc elements defines a synchronization mechanism between a first node element representing a source process and a second node element representing a destination process, and the parameter data that can be linked to the arc elements representing a synchronization mechanism [includes]comprises a sync release

time relative to an execution time of the source process and a sync frequency.

8. (currently amended) The [system]computer-accessible medium of claim 7 wherein the source and destination processes connected by an arc element representing a synchronization mechanism can each be periodic, aperiodic, or continuous.

9. (currently amended) The [system]computer-accessible medium of claim 8 wherein the synchronization mechanisms associated with an arc element selected by the user are tested for selection of an illegal synchronization relationship between node elements selected by the user.

10. (currently amended) The [system]computer-accessible medium of claim 9 wherein the illegal synchronization relationships tested by the system include:

(a)[[a.]] connecting a periodic source process to a periodic destination process with an arc element representing an aperiodic synchronization mechanism;

(b)[[b.]] connecting an aperiodic source process to a periodic destination process with an arc element representing a synchronization mechanism; and

(c)[[c.]] connecting to a single process with multiple arc elements defining different synchronization mechanisms.

11. (currently amended) The [system]computer-accessible medium of claim [[1]]5 further comprising an output file generator operable to select and organize pre-defined portions of the simulation architecture data files into an electronic output file that can be used for generating computer code defining a computer simulation

corresponding to the architectural description created by the user on the workstation.

12. (currently amended) A method of creating on a computer workstation a graphical description of the architecture of a simulation of a real world system, the method comprising:

(a)[[a.]] selecting at a graphical user interface one or more graphical node elements from a standardized set of graphical node elements displayed on the workstation, the selected node elements representing pre-defined real system components, including processes and real system hardware, associated with the real system, wherein the real system components represented by the standardized set of node elements include external hardware devices periodic processes, aperiodic processes and continuous processes;

(b)[[b.]] selecting at the graphical user interface one or more graphical arc elements from a standardized set of graphical arc elements displayed on the workstation, the selected arc elements representing pre-defined timing, control, and data relationships between the selected node elements;

(c)[[c.]] arranging on the graphical user interface the selected node elements and connecting the selected node elements with the selected arc elements to create and display on the workstation the architectural description of the simulation of the real system;

(d)[[d.]] entering at one or more parameter data input windows associated with at least some of the selected node and arc elements parameter data that further defines properties of the selected node and arc elements found in the real world system; and

(e)[[e.]] saving, in one or more simulation architecture data files, data about the selected node and arc elements, data about the user defined arrangement of the node and arc elements, and the parameter data input by the user.

13. (presently amended) The method of claim 12 further comprising[the step of] generating an output file containing selected portions of the simulation architecture data files.

14. (cancelled without prejudice)

15. (currently amended) The method of claim 13 wherein the standardized set of node elements further [includes]comprises at least one simulation container representing in a single node element a plurality of the real system components.

16. (currently amended) The method of claim 15 wherein the standardized set of node elements further [includes]comprises a boundary node.

17. (currently amended) A method of creating on a computer workstation a graphical description of the architecture of a simulation of a real world system, the method comprising:

(a)[[a.]] selecting at a graphical user interface one or more graphical node elements from a standardized set of graphical node elements displayed on the workstation, the selected node elements representing pre-defined real system components, including processes and real system hardware, associated with the real system;

(b)[[b.]] selecting at the graphical user interface one or more graphical arc elements from a standardized set of graphical arc elements displayed on the workstation, the selected arc elements representing pre-defined timing, control, and data

relationships between the selected node elements herein the pre-defined timing, control, and data relationships represented by the standardized set of arc elements include data transfer between processes, synchronization between processes, and synchronization with data transfer between processes

(c)[[c.]] arranging on the graphical user interface the selected node elements and connecting the selected node elements with, the selected arc elements to create and display on the workstation the architectural description of the simulation of the real system;

(d)[[d.]] entering at one or more parameter data input windows associated with at least some of the selected node and arc elements parameter data that further defines properties of the selected node and arc elements found in the real world system: and

(e)[[e.]] saving, in one or more simulation architecture data files, data about the selected node and arc elements, data about the user defined arrangement of the node and arc elements, and the parameter data input by the user.

18. (currently amended) The method of claim 17 wherein the standardized set of arc elements further [includes]comprises a communications container representing in a single arc element a plurality of the timing, control, and data relationships.

19. (original) The method of claim 17 wherein the synchronization relationship represented by one of the arc elements defines a synchronization mechanism between a first node element representing a source process and a second node element representing a destination process, and the parameter data that

can be linked to the arc elements representing a synchronization mechanism, the synchronization mechanism [includes]further comprises a sync release time relative to an execution time of the source process and a sync frequency.

20. (original) The method of claim 19 wherein the source and destination processes connected by an arc element representing a synchronization mechanism can each be periodic, aperiodic, or continuous.

21. (original) The method of claim 20 further comprising automatically testing the synchronization mechanisms associated with selected arc elements for use of an illegal synchronization relationship between selected node elements.

22. (currently amended) The method of claim 21 wherein the illegal synchronization relationships tested further comprise:

(a)[[a.]] connecting a periodic source process to a periodic destination process with an arc element representing an aperiodic synchronization mechanism;

(b)[[b.]] connecting an aperiodic source process to a periodic destination process with an arc element representing a synchronization mechanism; and

(c)[[c.]] connecting to a single process with multiple arc elements defining different synchronization mechanisms.

23. (currently amended) The method of claim [[13]]17 further comprising organizing data in the output file for use in generating computer code defining a computer simulation corresponding to the architectural description created by the user on the workstation.

24. (currently amended) A system for creating a graphical representation of the architecture of a computer simulation of a real world system comprising:

(a)[[a.]] a computer workstation having a processor, display, keyboard, an operating system causing the processor to generate a cursor on the display, a pointing device for manipulating the cursor on the display, and a data storage device;

(b)[[b.]] a first software module operable to generate a graphical user interface on the display;

(c)[[c.]] a second software module operable to display on the graphical user interface a pre-defined set of graphical node elements, the node elements representing pre-defined real system components, the real system components including processes and real system hardware associated with the real system, wherein the real system components represented by the standardized set of node elements include external hardware devices, periodic processes, a periodic processes, and continuous processes;

(d)[[d.]] a third software module operable to display on the graphical user interface a pre-defined set of graphical arc elements, the arc elements representing pre-defined timing, control, and data relationships that can be associated with the real system components, wherein the pre-defined timing, control, and data relationships represented by the standardized set of a elements include data transfer between processes, synchronization between processes, and synchronization with data transfer between processes;

(e)[[e.]] the second software module further operable to allow the user, using the pointing device, to select one or more of the node elements and position the selected node elements in a user-defined arrangement on the display corresponding to the simulation architecture;

(f)[[f.]] the third software module further operable to allow the user, using the pointing device, to select one or more of the arc elements and position the selected arc elements on the display to connect the selected and positioned node elements so as to associate one of the pre-defined timing, control, and data relationships with the node elements connected by the selected are elements;

(g)[[g.]] a fourth software module operable, in conjunction with the graphical user interface, to open parameter data input windows linked to one or more of the selected node and arc elements and receive from the user parameter data further defining properties of the linked node and arc elements; and

(h)[[h.]] the operating system further comprising operability[farther operable] to store on the data storage device simulation architecture data files containing data representing:

the selected node and arc elements,

the arrangement of the selected node elements,

the connection of the selected node elements by the selected arc elements, and

the parameter data input by the user.

25. (previously amended) The system of claim 24 further comprising an output file generator module operable to select and organize

pre-defined portions of the simulation architecture data files into an electronic output file that can be used for generating computer code that defines a computer simulation corresponding to the architectural description created by the user on the workstation.